

Bees

The best way of taking the sting from a bee, is to catch it on a piece of soft leather. The bee flies off & the whole sting will be left behind. It should then be examined under the microscope. The sting will be seen to consist of a long dart in the groove of which lie the two lancets. If the sting is only a slight one these do not enter the wound - but the bee has the power of thrusting the lancets down into the entrance made by the dart & the saw-like tips prevent them from coming out. Pouch-shaped feelings by the sides of the dart, & covered with hairs, are used by the bee before it stings. Muscles attached to the dart communicate with the lungs & a membranous tube leads from the poison bag to the lungs. The whole of this apparatus is drawn into the last two plates in the body. The Hymenoptera include bees, wasps, ants, chalcidion-flies, saw-flies, gall-flies & termites. There are mandibulate insects - i.e. those having mouth parts formed for biting & sucking.

Characteristics - four membranous wings. Small size of pro-thorax. Most of the females possess stings useful for many purposes & all undergo the changes of egg, larva, pupa & insect. Tribe Aculeata - Social insects, needles, females & workers neuters. The egg-placer is modified into a sting & the larva are footless grubs. To this tribe belong - honey bees, bumble bees.

11p67pneu162 63

Bombylius lucorum & Bombylius Muscorum. The wild bee makes its nest in a deserted mouse-hole. The B. Muscorum makes its nest in mossy banks or walls. The female hibernates in spring. Looks for its nest in a dome of moss lined inside with wax. In the ovary cells ~~are made~~ of brown wax in which is placed a ball of pollen & honey, as food for the young. When fully grown the larva spins cocoons from which issue only worker-bees.

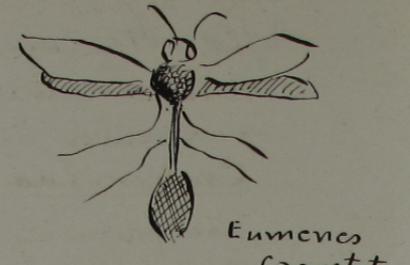
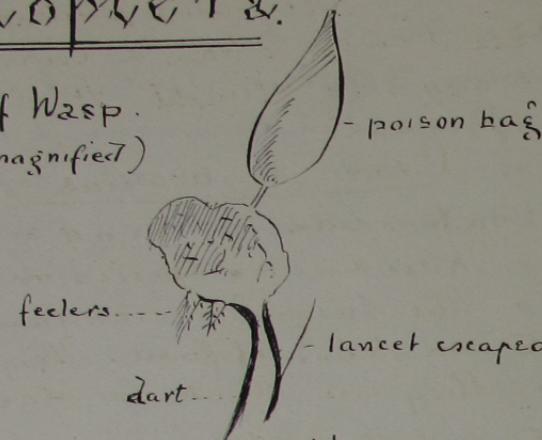
Bombylius lapidarius - Stone Bumble Bee. orange red. tail. This fertilises the common red clover. By reason of its long proboscis it can get honey from the flower without biting through the tube. Attempts have been made to introduce this insect into Australia.

Solitary Bees The Leaf Cutter Bee bites out little pieces from Rose & Poppy leaves - it lines its underground nest with these - In the nest it deposits its egg & food stuff. Sometimes a parasitic fly comes in & lays its egg. The larva is said to feed upon the egg & food stuff of the bee.

Hoop Shaver. This bee shaves off the hairy covering of the Campion to line its nest with (Albeit white) It is found on a sunny bank or dry sandy soil are Mason & Leaf cutter bees.

Diptoptery.

Sling of Wasp.
(highly magnified)



Social and Solitary Wasps.

Vespa Vulgaris. Common wasp - only too well known. Early in the spring a few solitary females are seen hunting on banks & hedges for a suitable spot to form a colony.

Probably decides in the end upon a deserted mouse-hole. The first grub forms working wasps, which are all neuter.

In this country we have other members of the family Vespidae - The Hornet (Vespa - Crabo) & the Wood Wasp (Vespa sylvestris). The hornet usually builds its nest in hollow trees. It consists of tiers of brown paper cells separated by short thick pillars.

The wood wasp suspends its nest from branches of trees. The entire colony is incased in layers of paper as protection from the weather.

Solitary Wasps. Eumenidae

Odynerus parvistum - Wall wasp. Found on sunny banks & walls or bramble stems. Beautiful cells are found in hollow stems & in cut open reeds.



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There are not so many solitary wasps as bees.
The wasp sting is on the same principle as the bees.
The Humble Bee however has a curved sting
whereas the wasp's is straight. It is of great im-
portance to the owner.

Crabronidae. Crabo Cribarius

The family Crabronidae or sand wasps are well represented. There are 30 species or more - of which C.C. is the largest. Such families confine themselves to one kind of food. They vary in colour & markings - they are black, or black & yellow, or black with a red base to the abdomen.

Pompilus Fuscus 1/2 long & black.

The first 3 segments of the abdomen are red banded with black. A burrower in sandy places.

All wasps are insect feeders - omnivorous.

The solitary wasp paralyzes its food with the sting. Those thin-skinned are slightly stung - hairy food is stung to death. The exterior has to be allowed to soften.

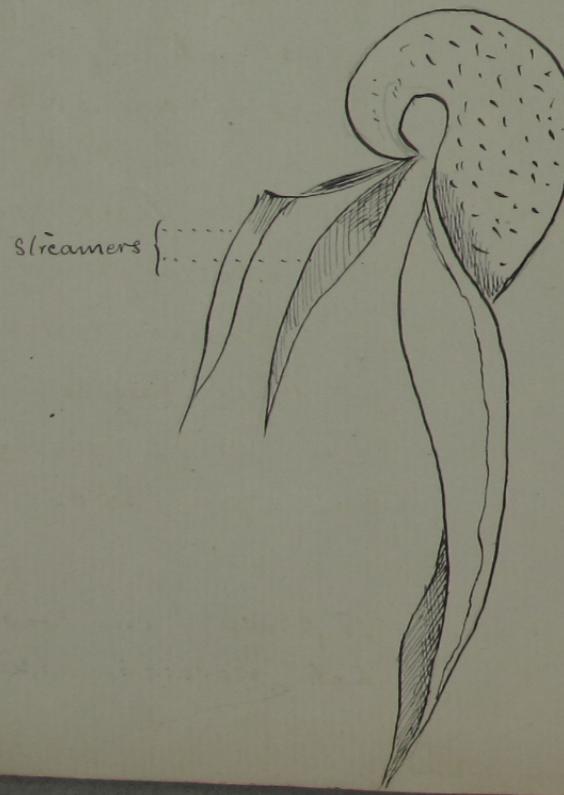
Books of reference "Workers without Wage" E. Carrington
Ants, Bees & Wasps - Sir S. Lubbock.

One of the most curious of solitary wasps is
Eumenes Coarctata

11 p70 pnew62

Pitcher Plants.

The "Darlingtonia" is a marsh plant discovered 50 years ago in the Sierra Nevada (S. America) but it was not until 1855 that the plant was introduced as Darlingtonia California. The flowers are large & strange & the leaves rise in clumps 10-12 or 18 inches high, they are slender tubes extending upwards like organ pipes, but re-curved into a hood or helmet which is brightly splashed with red. The small opening is concealed by gaily-tinted banners like streamers. A curved pathway runs upwards to this from the ground, the edge being incurved all the way, making an easy entrance to destruction for the insects. If a pitcher plant is slit open a mélée of mouldy corpses is brought to light.



Leaf of Darlingtonia

Helmet, with
translucent spaces
letting in the light



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The Sarracenia is a native from Florida to Canada (diagram from Madagascar). The hollow leaves are trumpet-shaped & open widely to the sky. The lid corresponds to the perianth of the Darlingtonia, which is much more developed in the trap. The flower of the Sarracenia is solitary, it has a long stalk & dull red petals with a very dilated style. It keeps its victims by means of deeply incurved margins. The insect sees the light above through translucent window-spaces & tries to get out through the lid thus missing the real opening.

The Sarracenia has drops of nectar running down into the pitcher & within is a coating of fine stiff hairs.

In the Sarracenia Purpurea the nectaries have to be reached by descent & for this purpose the hairs all slope downwards - an insect as large as a wasp or blue-bottle can be detained by these. In this normal state pitcher plants secrete a fluid which has fatal properties. Eggs are sometimes laid by the american blue-bottle on the edge of the plant that the young may eat the refuse. Spiders also spin webs over the openings.

The Nepenthes (pitcher plants proper) are widely scattered over the oriental tropics - the heaviest numbers being in the Malay Archipelago.

xi p72 pnew 162

72
& northward into Cochinchina. In all the species the pitcher is borne at the end of a long tendril-like prolongation of leaf. It varies from an inch to a foot or more in length. Two varieties occur in many species; the first is associated with the lower leaves and developed during the younger stage of the plant. It is not uncommonly found resting on the ground. This form is short & broad, with broad external wing-like prolongations forming a pathway for the insects.

The Adult form is longer & narrower with external wing-like appendages less developed or absent (no longer required for insects without wings). The anterior of the leaf stands well open, being no longer of use unless to throw off rain or, being baited with nectar, to attract insects. The rim has a fluted surface & turned in & down thus strengthening the mouth & keeping it open. The insect is easily led over the verge & tastes the fluid secreted in a row of flask-shaped glands along the very edge of the low in-curved rim. This fluid has great wetting properties & consists of oxalic, citric acid, chloride of Potassium, carbonate of soda & magnesia. It is known as Azeine
disputed

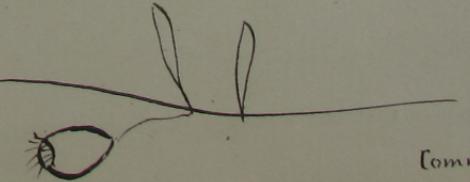
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As in the Sundew the wings of the insect become instantly saturated so that it cannot fly away. Some pitchers are so large that small birds can be captured by the hooks projecting from the lid of the leaf.

We have a little pitcher plant which is a native of Britain viz. the Bladder-wort (*Utricularia vulgaris*). It is found in streams & has a floating stem, for a month or two in summer it puts forth little golden blossoms, orchid-like in appearance, but akin to the primrose which represents its ancestral form as lilies do orchids, or potato-blossoms fox-gloves & snap-dragons. It has no root, but the floating stem has numerous much divided slender leaves from which little tiny pitchers are formed. Each bladder is a simple trap, consisting of a hollow chamber too rich in length & subtended by a thin door or valve which shuts instantly against a thickened projection or collar round the mouth. Water fleas are the principal victims.



Common Bladderwort.

74

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Nepenthes

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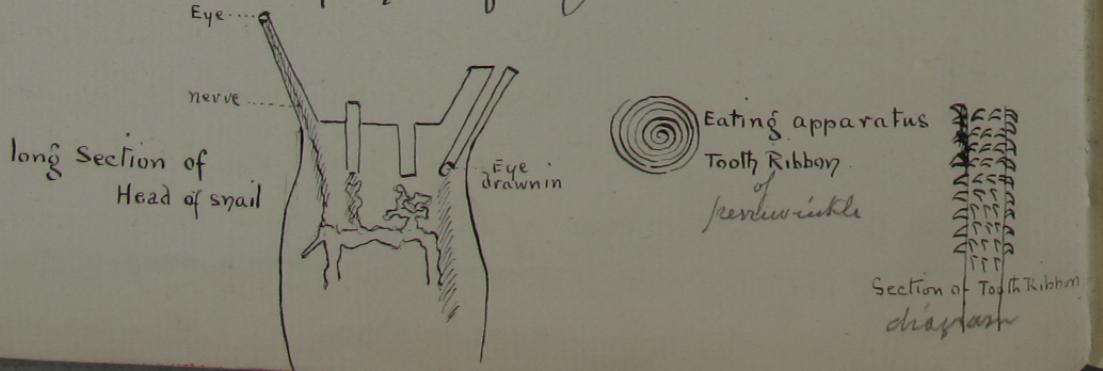
Nepenthes
(Young form)

Snails & Slugs.

Both land molluscs - all heads bearing a breathie through a lung directly connected with the open air. On the right side of the slug may be seen a round hole which leads into the lung. The same hole is in the snail situated under the lip of the shell. The part of the snail going round the edge of the shell is the collar. The sliminess of the snail is owing to a secretion - mucus - because it is impossible for them to live with a dry skin. Snails hibernate & protect the mouth of the shell by a skin with a hole in it.

Slugs descending from a bright sun a thread of mucus, which of the ladders in the air before they can reach their destination.

The horny part (operculum) of the periwinkle corresponds to the skin over hibernating snails. The Black slug (*Ariolimax ater*) has a little shell under its skin on the neck. Another grey slug (*Trifasciella*) has its shell on the outside of its tail. The eyes of the snail can be drawn in when touched like the fingers of a glove turned inside out.



See it as *pesona* & *Lemay* (great Grey Slug) it walks $\frac{1}{2}$ inch & 77
has 20,000,000 teeth. 11 p77pneu162

The tooth ribbon consists of a sharp-like pincushion 2 1/2 inches long - bearing 600 rows of teeth, about 3 in a row. It comes gradually forwards as the old teeth wear away & is called a tongue or rasp. The part upon which the snail walks is called the foot & it moves by the expansion & contraction of the muscles.

Helix Aspersa - Common Snail. Found everywhere. Keeps down vegetation - the lighter ones which are stronger & more healthy come from Cornwall.

a. Helix Nemoralis - Hedge Snail

b. Helix Hortensis - Garden Snail -

The last two are much alike. In (a.) the inside of the lip is white; in (b.) the lip is brown.

They may be plain yellow or brown, striped or otherwise.

Helix Aulustorum Orchard Snail - Always some shade of mottled brown - lip white - big whorl has brown stripe.

Helix Pisana, banded Snail - Rare but very like

Helix latissima - covered with fine lines & dots & generally some shade of yellow. "Shell $\frac{1}{2}$ inch high in diameter - not height not so much - voluteous flattened at the top - Colour, whitish or yellowish.

The bands are often broken into dots - the mouth is generally rose-coloured.

78 Helix Lapicida - Stone Cuter Snail - Found in cracks

in stone places.

Clausilia lutea, Varinated Close Shell - almost
always found on Beech trees - the twirls almost
exactly reproduce Beech buds, especially in spring
when the cases of the buds drop off. The mouth
is on the left side - it is provided with a little
trap door to keep out insects; which shut when
the snail is inside.

Bulimus Acanthus - Banded twist shell - Found
on sandy pastures in W. of England - Wales -

Scotland.

Cyclotoma elegans - Elegant Ciccare Shell - Pale grey
tinged with violet. This is one of the few British
snails that has an operculum which it carries on
its back & having withdrawn into its shell, shuts
the little door. It is found on chalky hills.

Hydra

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This is a low form of animal life. It may be found hanging down from duckweed. Its body is a hollow cylinder with a number of tentacles surrounding the mouth, which are also hollow. Its whole surface including tentacles, is covered with tiny elevations, which enclose thread cells containing stinging bodies, supposed to have the power of stinging animals, for which reasons it is included in the order Cnidaria. It feeds voraciously on water-fleas & other small animals, which are forced into the cavity of its body. All that is nice is digested, the remainder is ejected. Animals two or three times larger than itself are caught & are squeezed into its distensible stomach, although its tentacles are often broken off in the struggle. It is still an open question whether the little elevations contain stings or not. Some say they have them at their prey others deny this. Baker describes how they seize their prey with one tentacle & carefully poised

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They contract this tentacle & bring the prey within reach of the others. Directly clasping it tighter they draw it.

Reproduction

th species

The hydra reproduces itself in three ways.

1. By Budding. Young ones form on the side at the rate of 20 per month. As soon as a young one is formed it catches food for itself, before it detaches itself from the parent. This is a summer process.

2. By means of eggs. This is a winter process.

3. It contracts & forms a jelly mass & young ones are formed inside, after which the skin bursts & frees the little ones.

Its powers of reproduction are marvellous. It has been discovered that if its body is cut in any direction & into many pieces, each piece will form a perfect hydra.

If the creature is wounded young ones spring from the injured side. If two pieces are joined they will form one. There are 3 varieties.

(1.) Green with shorter tentacles.

(2.) Red with from 6 to 8 tentacles

(3.) Orange. Brown with more delicate tentacles
from 4 to 12.

Meliceria Ringens

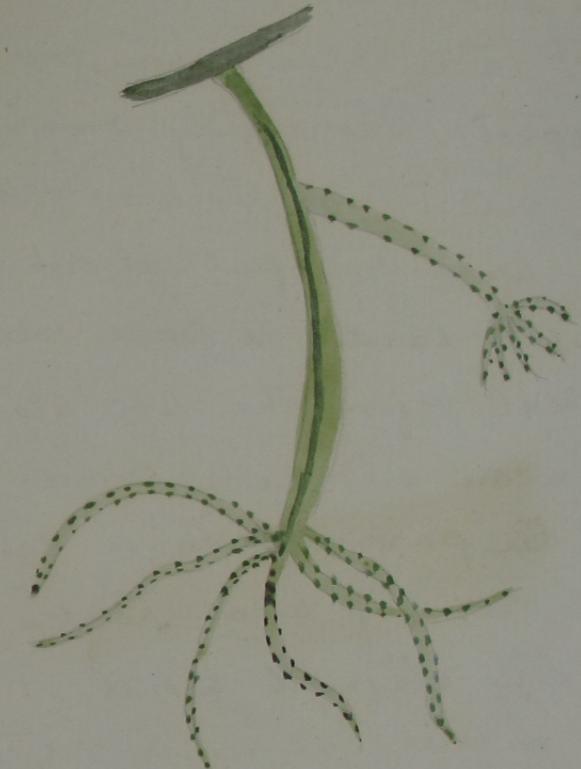
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This animal belongs to the rotifers.

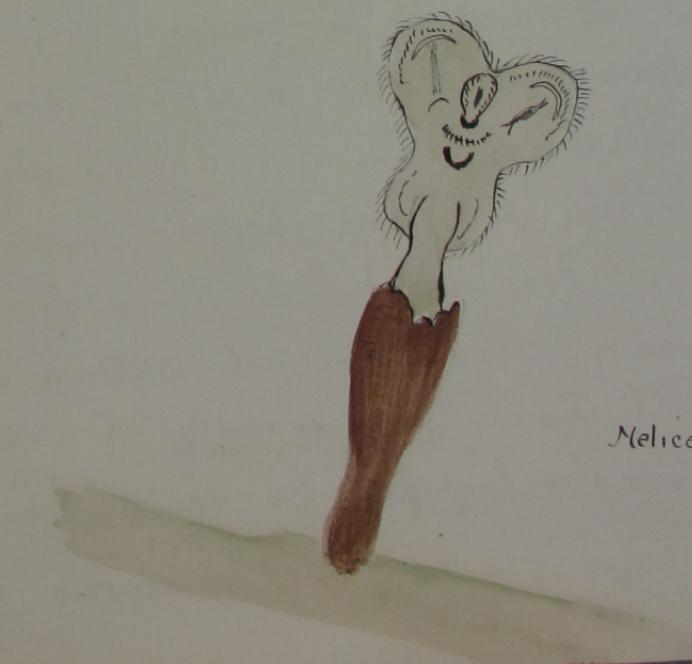
They are supplied with expanded discs round the mouth, fringed with cilia, which sweeps the prey into the mouth. It lives in a sort of house, which it builds up with the mud from the ponds it inhabits. Knobley gives a charming description of them in Water Babies



Hydra Vulgaris



Hydra viridis



Meliceria Ringens

11 p 83 pnew 62

How to make a Water-Aquarium.

Procure a bell-glass - from 1 to 2 ft in diameter. Insert this into a wooden stand. Place it on some secure table near a window with a north aspect. Thoroughly wash some small shingle & put it into the glass to the depth of 3 inches - upon that put about 1-inch of well-washed sand. The pond-weeds must be put in next before the live stock.

The American & Common pond-weeds are good for the purpose. These can be hooked out with ordinary meat-hooks X & will be found in any elegant pond. Tie stones to the ends of these and see that they sink well down in the sand in the glass. Then gently fill with clear soft water to within an inch of the top. Leave it then for a few days to settle. The weeds will very soon become covered with bubbles of oxygen. For getting live things from ponds use an ordinary glass jam-pot with a strong handle across the top. It is necessary to consider what things will live together for some - e.g. the larva of the Dragon-fly are very voracious & would

11 p 84 pnew 62 85

draw the other inhabitants of the Aquarium in a very short time. The if. net has meshes too large for purposes of pond-fishing so it should be lined with muslin or cheese-cloth - a more open. Sieve net may be made of bamboo cane & brass wire. The wire Y-shaped - is inserted into the cane while the two upper ends are fastened to or worked into another slender piece of cane to which the net may be fastened.

Newts are very good specimens to have. They are found in ponds covered with duck-weed, but as they are obliged to come up to breathe their presence will soon be discovered - one day on this edge - one day on that - when in the larval stage they breathe through gills & do not rise. Some newts are very handsome - black & bright yellow or orange underneath. The male newt has a frill along his back & has a rough skin. The female is quite smooth & has no frill. They are from 4 to 6 or 8 in. in length. When the newts are safe in the aquarium put a piece of perforated zinc on the top & put in the water round flat pieces of cork - the newts will come up to breathe & will sit upon them.

86 Put in with them a handful of clean duckweed for them to find water insects in upon which they feed. In a day or two they will change their skins. They turn them completely inside out & generally eat them. In the spring the newt lays its eggs & rolls them up in leaves joined together by a kind of gummy secretion. If there is too much vegetable life in the glass, the water gets muddy & a kind of film forms all over it. To keep the glass clean get fresh-water snails which will eat the Protozoans, which causes this film. If there is too much animal life, the water gets bad & waterha will cover the sand at the bottom.

How to keep it fresh. To supply the aquarium put in an india-rubber tube with one end in a pail outside - or if required to supply it gradually hold the tube in the water. Pour a little water down to start the upward flow & then as the water spouts out more the end of the tube over anything in the glass that requires removal it will be drawn up by suction.

Fresh-water mussels & trumpet-snails will be suitable to keep, also little minnows, carps & small gold-fish; or sticklebacks - but the

(water must not be mixed with other things). If duckweed be constantly supplied no fresh food will be necessary. Small water beetles may be kept with them but they like to fly at night so must not be kept in long (they are besides very ravenous).

(*Dytiscus marginatus*, Great Water Beetle)

Water scorpions should not be brought in (readish slugs). Water boatmen are harmless & whitelike beetles - those of a brilliant blue that swim round & round on the top of the pond.

Water Spider. There are getting very rare & may be considered a splendid 'find'! This little sea animal has a bell-shaped nest of web attached under the surface of the water to some pond weed, with the mouth down-wards. The spider travels to the surface to obtain a tiny bubble of oxygen which it brings down in the hairs of its body between its legs & introduces into the mouth of the nest, by turning the tail up. She breathes this oxygen & in her journeys to & fro never gets wet because she is always enveloped in bubbles.

Nov. 21.

ii p87 pneul62

The Animal Kingdom is divided into

Class I. Vertebrate

Class II. Invertebrate - Annulata

Annulata { insects
 spiders
 Millipedes
 Crustaceans & worms.

So-called because their bodies are composed of rings.

Insetts. Bodies cut into ~~two~~^{sechs} divisions in - into : ~~sechs~~ - cut. The body of a butterfly has three divisions. Head - Thorax - Abdomen. The Head has one pair of antennae - a pair of eyes on its forehead on the side of the head & mouth & jaws below. The thorax or chest has the six legs & two pairs of wings.

The Abdomen is the hinder part of the body.

Insetts undergo metamorphoses

Those of the butterfly are

1. Egg.
2. Caterpillar.
3. Chrysalis
4. Perfect Insett.

ii p88 pneul62 89

They always have three pairs of legs.

All have one pair of antennae

All breathe by means of holes - tracheæ cased with a horny substance, kept open by means of a spiral thread.

Crustaceans or Arthropoda or Jointed-footed animals - (Arthropoda - a jointed joint - a foot)

Part of the food goes to form a sub-skeleton called chitin, which is something like horn, & this is deposited in the outer layers of the skin & makes a firm skeleton all over the body & eyes & antennæ & legs - within this the soft animal lives.

When the crab grows he has to cast off his old skeleton, & wait till the new one forms itself. He creeps into the darkest corner & there waits. It is a painful process for them because their joints are so small.

90 When the Hermit crab wants to change, he simply hooks a larger shell on to his old one & gradually works his way into it; he often has a lodger in his shell, & one has been seen to eat the very food out of the Hermit's mouth.

Stages of Crab. Egg-Zoe-Mesopha-Bat.

Barnacles. Acorn. Duck-bill.

Acorn. Shells seen on timber & rock on shore & on shells of shell-fish e.g. mussel. like half an acorn (*Balanus*) other shell has triangular markings. White in colour & appear mostly to be shut up. Whole shell like raised pie - appear to be lifeless but really belong to crustaceans. When placed in water - trap-door at top opens & little feelers come out & lash water. These feelers are the legs of the creature - every now & then some little swimming creature is swept into shell. Place specimen in (number of artificial salt-water (1oz. sea salt $1\frac{1}{2}$ pt water) & watch in strong light. Found especially on oyster-shells.

Hairy lashes disappear after a time. Animal is inside, wh. makes shell from carbonate of lime out of old food. Head is fastened into its shell "Kicks its food into its mouth" - mouth like proboscis, modified to suit its environment - swollen lips, little palps & jaws serve as lower lip - strong teeth from mouth to gullet - food brought by legs & pushed down. There are numerous & hairy. Has perfect stomach - curved & bent up & has branching liver tubes & glands - is lined with minute cells wh. secrete digesting fluid & turn the minute prey into liquid food as ^{for shell mussel} non-digestible parts mixed up with lining & rejected - muscles attached to legs & trap-door apparatus. Side pieces of shell 6 - divided into 6 compartments. 6 broad above, narrow below 6 vice versa - like 12 triangles.

Trap-door 4 pieces so arranged as to be left open when required so that feelers can come out. At certain time eggs collect in shell - & are cast out. At once a little free swimming thing comes out - long triangular shaped body with projections at side, front & tail end. Swims with hairy legs then grows quiet & changes skin - undergoes several transformations.

then assumes perfect form - Axis itself by head & suckers on rook - eyes do appear - mouth opens - legs free - henceforth is fixed - reproductive organs appear & same process is continued.

Prawns, largest size about $2\frac{1}{2}$ inches - not counting the antennae - colour of sand exactly - & when in sea small black spots.

Pink when boiled. Same happens to other Crustacea - (lobsters - crabs & cray-fish) owing to colouring pigment in shell.

Prawns abound off sandy shores - square frame with net fitted on best for fishing -

Food of prawns - any decaying matter like waste of crustaceans.

Homing - brasse - a kind of fish.

Colouring - Grey - colour is protective - soles & flounders sand colour for same reason.

Prawns burrow in sand.

Covering homing - also protective -

large plate cover what is apparently head.

Six plates behind a narrow plate running along tail - these move easily upon each other

when tail straight out & is suddenly bent 93
he goes back - vice versa is pushed forward -
Under tail are swimmerettes -

upper side of body can be stretched -
lower side can be doubled up -

Plates are joined on side nearest head
head contains the stomach

2nd joint behind head laps out - helps to stiffen tail - Every joint has a limb attached
Each is branched & ends in curved & pointed tips - last joint has swimmerettes

Tail fin 3 pieces - 2 flaps - concave piece & 2 flappers - which serve to propel body -
On under side of apparent head are 5 pairs of long jointed legs - little tiny nippes
on 2nd pair - crush on 1st pair.

Danger plate of head serves for number of tufts drawn together to make solid shield

6 organs under head - forming mouth -
back from side to side - jaws are all limbs
two pairs of feelers - long antennae many joints
broad scale like organs make current come

prawn mouth
into fish's mouth - Edible portion is muscle

of prawn - shanks pass from skin to skin -
two rounded knobs placed behind inner feelers -
consist of many lenses placed side by side.

el p93pneu162

94 Prawn has spine on head - Shrimp has none -
Gills under scales of head - when alive
filled with blood

95

British Trees.

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The Ash is a native of Britain.

The leaves are compound & arranged in five or six pairs of leaflets opposite to each other along a central leaf-stalk. It is disposed to grow tall & stately, but in plantations & woods it grows tall & thin; in parks & lawns it becomes a large & spreading tree. The duration of the Ash is considerable. In Scotland there is an instance of a tree that is nearly 300 years old. It is evident that this tree was well-known to the ancients. Homer speaks of the "mighty ashen spear of Achilles" & Virgil says "the lowing ash is the fairest in the woods". In the Swedish Edda the Council of the Gods is said to have been held under the shadow of the sacred ash, "whose branches cover the world". Sometimes the tree grows to great dimensions one having been found in a churchyard in Scotland measuring 58 ft in circumference 5 ft from the ground. Another was found in Galway measuring 42 ft. The Ash keeps long together at the end of the branch, several in a bunch with one seed at the end.

¹⁰⁷
The Mountain Ash or Rowan is a small tree or shrub which grows to a height of about 20 ft. It is not related to the Ash, which it does not resemble; it is more nearly related to the pear & apple. The Magicians are said to have made their spears of this wood to defend them from the ~~enormals~~. In Wales it is considered a sacred tree, there is hardly a churchyard without one. It was also one of the Druids sacred trees, (this may be on account of its red berries. It has been observed to grow most abundantly in the neighbourhood of the ancient circles of stones which are found in N. Britain.

Beech Fagus sylvatica. This is a common British tree & is often seen in a dwarf condition in hedges. It is easily known by its smooth bark & light green leaves. The leaf is ovate, with a hardly-preserved toothed margin; it is smooth, with parallel veins which proceed immediately to the edge of the leaves. When young there is a delicate silky pubescence over the edge of the leaf; this is not seen in an old leaf. The dead leaves may in winter be seen clinging on the hedges, not upon the trees. The ground under the beeches is generally bare owing to the quantity of leaves that accumulate under them. The wood rots easily in the air, but not under water, for this reason it is used for water-wheels, buckets &c. The birds-nest orchis is a parasite on the roots of the beech. It is so called because it grows in a nest of roots on the beech-root. The nuts of the beech are enclosed in a smooth triangular case. The name is taken from the A. S. beoch.

108 There is a legend about the forest of St. Leonard which is full of beeches, that when St. Leonard was resting under their shade he was disturbed by the singing of the birds & the singing of the nightingales. He prayed for their removal & after that it is said - "The bird was never known to sing Nor the nightingale to sing"

Sycamore (Acer Pseudo-Platanus)

The leaves are 5-lobed & unequally serrated. The racemes are pendulous. It is often confused with the plane-tree, but though the leaves are somewhat similar the trees are really of different character. The sycamore tree mentioned in the scriptures upon which Zacchaeus climbed was a kind of fig-tree. The maple & sycamore are very closely allied. When young the sycamore forms a massive tree resembling the oak, the leaves make it look heavier than the oak & it gives a denser shade. The young spring leaves are very pretty, showing hints of red, amber & orange, but the leaves become opaque with age. They also become much eaten by insects, & the honey-dew which the aphides exude makes them so sticky that the dust from the roads easily adheres to them & gives them a dirty appearance as summer advances. They shed the bark very early in the autumn, & the autumn tints are very rich & assumed early.

"The Sycamore
Capricious in nature, now green now tawny
And ere autumn yet has changed the woods
In scarlet London's bright" (Cowper.)

109 The wood of the sycamore is yellowish in the mature tree close-grained, but not very hard, therefore easy to work & polish. For this reason it is much used by turners cabinet-makers & makers of musical instruments (particularly violin-makers). It is the best wood that can be used for fuel, burning long & brightly. The sap holds in solution a quantity of sugar, & an attempt has been made in Scotland to manufacture sugar from it, but it has not been successful as a commercial operation. The chandlers sometimes make an incision in the wood & suck the liquor therefrom. Wine has sometimes been made from the fermentation. There is a sycamore at Kew which is a hundred years old; it is 74 ft. high & its trunk is 5½ ft. thick. but in the north there are some specimens of sycamore with trunks exceeding those at Kew. The sycamore becomes covered with small black fungi.

Oak *Quercus*

There are two forms of oak. (1) That which has the leaf springing without a petiole from the leaf-rod & the acorn with a foot-stalk. (2) That which has a sessile acorn & leaf with a petiole. In other respects the two oaks are almost exactly similar.

The growth of the oak is slower than that of the other native forest trees. The pedunculated oak (1) is generally the most common, but in some districts only the sessile oak is found.

The young trees produce acorns first when they are from 15 to 18 years old, sometimes earlier. The acorns or oak-nuts as they are called collectively, are not used for any purpose except that of the future supply of oak trees. Time was when our remote progenitors used them for food. As time advances they were abandoned in favour of wheat while they became used for food for swine. In early English history the feeding of swine on acorns was referred to under the name of pannage. Evelyn says 1 peck of acorns with a little bran will make a hog increase 1 lb a day for two months together.

The names of towns derived from oaks are numerous.

The original Saxon name was *Ac*, but it passed through many variations *Aek*. *OC.* *Oxe*. *Auk*. *Uck*. *Hocke*. *W.* was often prefixed, much in the same way as rustics say *Woals* for oaks.

With this explanation many names may be seen to come from oak. *Acton*. *Oak-ton*. *Acnington*. *Wockham*. *Woking*. *Hockerton* etc

The timber of the oak has had much to do with our maritime greatness, all our large ships being ^{built of} ~~used for~~ oak. On account of its durability it has been used for sacred & domestic architecture. The carved shrine of Edward the Confessor in Westminster Abbey now 800 years old is of oak. At Greenstead near Saffron Walden there is a curious church with walls of oak.

The trees had been split through the centre & pegged together

as a temporary ⁵¹ enclosure for the body of Edmund. Afterwards it was made into a parish church.

Names of famous oaks.

Cowthorpe oak on the Nid in Yorks.

Linden. *Tilia Europea*

Smooth Linden best obeys

The Carver's chisel; best his curious work
Displays in nicest touches"

This tree, being an inhabitant of towns is often considered a foreign variety. As a matter of fact it has been introduced from the Continent & naturalised in Great Britain.

The small-leaved lime tree grows chiefly in Essex & Sussex. The most remarkable specimen grows in Kent like the Indian banyan. The lower branches, borne down by their own weight have drooped to the earth, where they have taken root & sent forth a circle of fresh shoots, those in their turn have done the same.

The wood is smooth, yellowish-white, soft & smooth grained. It is used by turners, carvers & cabinet-makers, & for the sounding boards of pianofortes as it does not warp under changes of atmosphere. Its quality also recommends it for carriage-paneling. It is preferred for carving to all other wood. *Grinell* fibbons has used it in St. Paul's, at Windsor & Chatsworth, where it still looks as sharp, delicate & clean as when it first left the carver's hands.

Bast-matting is a product of the lime being prepared from the inner bark by being soaked in water until it is soft. The honey of the lime is esteemed beyond every other kind. In some parts a tea from lime blossoms is said to be a remedy for coughs. The caterpillars that feed upon it are the Lime Hawk moth, the Lobster moth, Buff tip, Dagger moth, orange moth & Porcupine Beauty.

112 Elm. *Ulmus Campestris* : Common Elm. 112/162

Ulmus Montana : Wych Elm or Witch Hazel.

The Common Elm though so characteristic of English scenery has had its claim as a tree indigenous to English soil disputed. Its well balanced contour, & fine effects of light & shade in summer & autumn make it a favourite with artists. Its average height is from 70 to 90 ft. The trunk from 4 to 5 ft in diameter.

Near Horsham there is a tree having a trunk 6 ft round at its base, inside the hollow cavity measures 36 ft. The floor is paved with bricks & a door has been cut in the side which is generally kept locked. The timber is used for Cart. building, & as it is durable in wet & dry, for the keels of ships, planking below the water-line & for water-wheels. The leaves were formerly gathered for fodder for swine & cattle.

The leaves remarkable for its uneven base & for its closely serrated margin.

The chief insect-eater of the elm is a little beetle (*Scolytus destructor*) which rids it of its parasites between the bark & xylem. Sometimes the channels diverge irregularly from a common centre.

Section of the bark bored by channels of *Scolytus destructor*. Only the female which is



Witch elm.

about $\frac{1}{4}$ inch long, rids its way through the bark & excavates the inner bark, laying eggs all along the track. When this is hatched the young grub eat away at right angles, turn to chrysalises, then hoppers which eat their way out & soon make the whole of the tree is undermined. 112/162

(section of bark eaten by borer with channels from a common centre. The oak moth also bores long galleries large enough to put one's finger through. The Trapling beetle or elm flea devours the foliage. It is a tiny little green & gold insect with well developed hind legs. The Conna, a tortoise-shell caterpillar frequent the elm & the goat-tailed moth..

Wych or Scotch Elm - distinguished by its growth from the common elm. It is less upright, looser & more spreading. The trunk divides at no great distance from the ground, & the leaves are larger & broader. This is the real indigenous elm. Some branches are pendulous & the trunk is valuable to cart-makers on account of its curious knotty excrescences. On account of the hawks of its name to Witch it is often supposed to have magical properties.

"Elderly Elm trees boughs did stoop and lean upon the dusky brushwood underneath Their broad curved branches, fledged with clearest green New from its silken sheath." Tennyson.

Alder. (*Alnus glutinosa*) fringes margins of lakes & pools. Most aquatic of our trees. 60 or 70 ft high. Trunk in proportion. Never grows on dry chalky soil. Wood white when standing, flesh coloured when cut used by turner & wood-carver. Clogs & wooden soles of shoes are made of it. Wood soft & of poor texture. Sabots made of it - harder than almost imperishable. therefore valuable for making piles. Pails are made of alder.

Ferns

A

Soft Prickly Shield Fern (*Polystichum aculeatum*)

Height 18 inches or two feet. Outline spear-shaped. Height 18 inches or two feet. Outline spear-shaped. Stalk of rusty brown scales. Leaflets glossy green, tapering to a point. Tufts of spore cases form a line on each side of the midrib.

Oak Fern (*Polypodium dryopteris*)

A slender creeping rootstock. Outline of fronds triangular, each branch again triangular. Each branch pinnatifid above, pinnate below. Found in mountainous districts in N. England, Scotland & Wales.

Beech Fern (*Polypodium phegopteris*)

Height 6 to 12 inches. Root stock wiry and creeping. Fronds elongated and triangular. Foot-stalk brittle & twice the length of the fronds. The two lower leaflets turn outwards and downwards, distinguishing this species from any other. It grows in mountainous districts near water.

Mountain Buckler Fern (*Lastrea montana*) sometimes called Boss Ferns. The spores are arranged round the margins of the leaflets. This is the fragrant mountain fern on account of the sweet odour it exhalts when drawn through the hand. The outline is spear-shaped. Foot-stalk very short. Branches diminish upwards & downwards. The lower surface of the frond is covered with minute glands containing the balsamic fluid which produces the sweet odour.

Male Fern (*Lastrea filix-mas*)

Height 2 ft or more. Most common & robust of the ferns. Rootstock thick as human arm. Scaly foot-stalk. Outline of leaf spear-shaped. Tufts of spore cases on back of leaflets. outer portion of frond barren.

Spleenworts

Common Wall spleenwort (*Asplenium trichomanes*)

also called Black-spleenwort. Height 4 to 6 inches. Black shining leaf-stalk. Green leaflets.

Green spleen-wort (*Asplenium viride*) Fronds seldom more than 4 to 6 inches long, stalk green, spores arranged in lines.

Scale Fern (*Asplenium officinale*) Rusty back, scaly spleenwort grows in close tuft from scaly root-stalk. Widely distributed on old walls & trees. Rare in the midland & eastern counties. Formerly had a reputation in medicine. The Arabs still believe in its potency. The scale fern was among the drugs sent from Tunis to the exhibition of 1851.

Hart Fern (*Blechnum spicant*). Has glossy stiff leathery fronds of two kinds produced in a dense tuft. Barren fronds are deeply cleft on each side, in the narrow lobes nearly to the midrib. The fertile fronds are divided quite down to the midrib. The stalk of the barren frond is very short, of the fertile frond very long. The spore-cases are in lines down each side. It grows in heaths, woods and rocky places. There are a great number of varieties.

Bracken (*pteris aquilina*) 3 to 6 ft in height. One specimen found on Hampstead Heath was 17 ft high. ^{spores, power} Skin a rhizome. The upper portion of the ~~root~~ frond is branched, the branches being produced in pairs. The whole frond is very compound. This fern is very astringent, containing much tannin. It is used in Ireland for bedding for animals, & in England for packing vegetables. Apples keep well in it. Lechen grows on the under surface of the fronds & often takes for spore-cases. It is really a parasite.

Broad Boss Fern (*Lastrea obliquata*) Foot-stalk thick at the base & covered with spear-shaped scales. The outline of the fronds is usually spear-shaped. Branches feathery. Fronds 14 to 15 varieties.

116

Filmy Fern (*Hymenophyllum Wilsonii*) very delicate and
so small as to look more like moss than fern.
Grows in clefts & shady nooks & near the spray of
waterfalls. The spore-cases are very interesting.



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117

Poisonous Plants

11 p105pneul62

Definition of Poison. A substance which can exert by its chemical action an injurious influence on the vitality of a healthy organic body or tissue. All poisons do not affect all organisms; for instance the deadly night shade & the hemlock do not poison pigs, the water hemlock is harmless to dogs, dangerous to man & notably so to cattle; the celandine is harmless to sheep.

Poison is represented in the three Kingdoms, animal, vegetable & mineral; it may be divided into three classes by its different modes of action.

- (1) Acid or Irritant e.g. Ranunculaceæ. orange.
- (2) Narcotics - acting on brain & nerve rendering insensibility. e.g. hembane & bittersweet.
- (3) Narcotic Irritants e.g. tobacco, foxglove, cow-horn, deadly nightshade.

Camphor, turpentine, ether, alcohol.

(4) Alkaloids. 1000 in the vegetable Kingdom, but only about 200 well known. Most of them contain violent poisons, among which are nicotine & strychnine.

Ranunculaceæ. Very poisonous - Acid or Narcotic-Irritant.

Flowers. Anemone Pulsatilla or Pasque Flower, contains with wood anemone an acid alkaloid which acts as a caustic by blistering the skin.

Upright Meadow Cowfoot (Ranunculus Acris.)

Creeping Cowfoot (Ranunculus Repens)

Buttercup (Ranunculus bulbosus)

Helleborus foetidus & Vindis

Larkspur. Delphinium Ajacis - Monkshood very deadly.

11 p105pneul62

Papaveraceæ

Melly fluid narcotic. Opium from incisions in stem of white foreign species. Rhubarb

Common Red poppy. (Papaver somniferum)

Great Celandine (Chelidonium majus)

Leguminosæ Peas, Beans, Clovers, Vetches - not very unwholesome.

Laburnum, toxic - yellow vetch very unwholesome

Rosaceæ Cherries, Plums, strawberries etc. These all produce prussic acid in the kernels of the fruit & in the leaves & flowers of the cherry, plum, peach. The almond & laurel produce very much.

The oil of bitter almond is very poisonous.

Cucurbitaceæ Melon, Cucumber, gourd, vegetable marrow, (Bryonia dioica).

Umbelliferae

Common Hemlock (Conium maculatum) with rough spotted stem. This plant contains an active principle named Conium. It specially kills most animals, but it is said sheep are not injured. It is also said that Conium acts on the nervous system & produces paralysis of the extremities before death. The juice mixed with opium was given to the Athenians & citizens who were condemned to death - e.g. Socrates.

Water Hemlock (Cicuta Virosa) or Cow-horn. It contains a volatile alkaloid (cicutine) harmful to horses & dogs; fatal to cattle & man.

The poison does not develop till the summer months as cows may eat the plant with impunity in the spring. This property is analogous to that of the opium of which the like is said not to be injurious in cold weather.

Oenothera fistulosa - Water Dropwort.

Crocata

Phyllanthus. There are perhaps the most virulent of the herbaceous: The resemblance of the roots of *Crocata* to parsnips of the leaves of the same & of the *Phyllanthus* to parsley & of their shoots generally to celery has led to disastrous results. The poisonous principle resides in the yellowish juice.

Toads Parsley (*Altusa Cynapium*) Odour induces nausea. The plants have been known to give lockjaw & caused speedy death. They may be known by the three or four lesser bractoles hanging from below each lesser peduncle.

Compositae

^{sub 24} *Wall Lettuce* (*Lactuca Virosa*) not *L. muralis*.

The lettuce secretes a milky fluid, which when exposed to the air hardens & is known as *Lactucarium*. This plant is probably not poisonous to man but has power as an injection. 36 grs will kill a dog if it is injected in 15 minutes. Some of the *Compositae* are poisonous to insects, notably the *Chrysanthemum*, *Rosmarinum*.

Or. eyed Daisy (*C. leucanthemum*) &

Hra. hane (*Thlaspi dysenterica*), said to be destructive to fleas.

Solanaceae. This order contains dangerous narcotic properties. It is found in certain parts of the plant when other parts are edible. For example the potato flower-stalk leaves & fruit are poisonous, & the tuber when grown in the light so as to become green. The tomato fruit is edible & the rest of the plant poisonous.

Atropa Belladonna: Deadly Nightshade - also called *Dwarf*.

This is the best-known among poisonous plants.

The active principle resides in the narcotic alkaloids.

is called Atropine. It is present in such large quantities in the berries that a very few have been sufficient to cause death. Half a berry has been known to be fatal to a child. Carrying them even will cause temporary paralysis of the hand. *Bella donna* dilates the pupil of the eye.

Solanum dulcamara, & Solanum nigrum

Sol: dul: - Bittersweet; Sol: nigr: - Common nightshade.

Solanine is present in these in various quantities. Alkaloid solanine is most readily obtained from the sprouts of the potato.

Hyoscyamus niger : henbane. The Alkaloid is hyoscyamine. It is poisonous to man but not to horses, cattle or swine. The leaves & seeds cause stupor and delirium.

Datura Stramonium : Horn Apple. This is not a native of Britain. It has a stupefying smell & is the most poisonous of the Solanaceae. It was used by the sorcerers of the Middle Ages & thus obtained the name Devil's Apple.

Scrophulariaceae. *Digitalis purpurea* : Foxglove.

This is powerfully poisonous. Many drugs are prepared from the leaves, the most important being digitaline.

Thymelaeaceae *Daphne Laureolæ* - Spurge Laurel

and *Daphne megerium*. Coccinuin comes from the *Daphne Laureolæ*. It is highly poisonous. The *Daphne Laureolæ* has black berries, the *Daphne megerium*, red.

Euphorbiaceae Spurges. We have about 16 species

representing the species *Euphorbia* - Many contain

a milky juice. (alix ^{wh.} or toxic). *Euphorbia lathyris*

has a hardened milky juice - *Euphorbia* - an irritant often used instead of capers - hence *Caper Spurge*.

124 Real capers are the flower-buds of *Capparis Spinosa*.
They are quite wholesome - but the fruit of the sponge
is toxic & is called in Spanish Wool's Navel.

Euphorbia Hibernica used by the peasants of Kerry
for stupefying the fish. A small handful of
crushed leaves will stupefy the fish for a mile or two.

Mercurialis perennis - annua. The mercury
contains a volatile alkaloid - mercurialine.

Persons have been poisoned through eating the
leaves of the Dog's Mercury, but *M. annua* is
sometimes boiled & eaten.

Urticaceæ. *Urtica urens* (Common Nettle)

Urtica pilulifera (little stinging Nettle).

The leaves are covered with hairs having silicious
walls. The hairs have hooks or caps which break
off when touched. The hairs enter the skin & the
sap being strongly caustic enters the wounds.

The sap contains formic acid (Coniferæ).

It causes a burning pain which soon disappears.
It is very virulent in tropical regions.

Coniferæ *Taxus baccata*. Yew. Leaves & kernels
of the fruit are highly toxic - they are often fatal.

Juniper *Juniperus Sabina* - poisonous. The tips
of the branches are dried & powdered.

Amaryllidæ. Narcissus. Daffodils. Snowdrops.

Every part of these flowers especially the
pods are - Narcissus are strongly toxic.

The active principle particularly strong in the bulbs.

Dioscoreæ. *Tamus Communis*. - Black Bryony.
Powerful acid properties. Death is the result

of medicine from its roots by Greeks.
125 Liliaceæ *Scilla maritima* - Sea Squill.
A yellowish white powder. Scillitin - a virulent
narcotic poison. Cats, rats, mice particularly
sensitive. *S. nutans* - bulb of common blue
Hyacinth very acid.

Colchicum autumnale. The whole plant of
the autumn saffron contains the alkaloid
Colchicin - the seed Sabadilic acid.

Acridaceæ. - *Arum maculatum*. Stalk, leaves
& fruits are intensely acid. The corn also
has this property, but by baking Portland safo
is produced.

Gramineæ. *Daniel* - Taxes - only one poisonous
species *Tolmiea menziesii* *trivulatum*. The flower has an
unpleasant smell when boiled in water - strong
effervescence. - When kneaded makes bed creeps.
Wood sorrel, leopard's bane, yellow load-flax,
Wall pepper, Sundew, Elder, acid lobelia,
hounds tongue, Box, Sorrel, Faedis Iris, Flag;
Herb Paris - all slightly poisonous.

Antidotes

126 The first & most important ^{object} to be attained in all cases of poisoning is to remove the poison. This is done by the prompt administration of an emetic, the readiest of which are.

Mustard 1 teaspoonful in a tumbler of hot water.

Salt "table" - - - - -

Sulphate of Lime grains 10-30 - - - - -

or Powdered Specacuauha 1/2a. spoonful - - - - -

followed when vomiting has taken place by copious draughts of warm water to keep up the effect & dilute the poison.

If vomiting cannot be produced the stomach pump should be used, or an india-rubber tube pushed down the back of the throat into the stomach & warm water poured down it - thus lower the end of the tube & it will act like a syphon thus emptying the stomach.

The special physiological antidotes to only a few of the vegetable poisons substances are known; these are -

Poison

Aconite & probably all
poisonous plants belonging
to the Ranunculaceæ

Digitalis - - - - - Aconite

Opium - - - - - Belladonna &

Atropin

Solanaceæ

Opium

Belladonna & Atropin - - - - - Opium

Stychnia Trux Vomica - - - - - Chloroform or Ether

(inhalation)

Bromide of Potash

Hellebore & all poisons ... Opium & Alcohol
Plants in the Liliaceæ

Alcohol - - - - - Theine & Caffeine.

In addition after an emetic for poisoning by all plants, the dangerous properties of which depend on their containing an alkaloid (vegetable alkali) administer weak acids (the most handy of which usually are the vegetable acids; in vinegar - acetic acid & in lemon juice - citric acid), or administer fixed oils in large quantities e.g. Castor, linseed, almond or olive oil. These form soaps with the alkalies & thus destroy their caustic or injurious effects. For plants whose toxic properties depend on a fatty oil, after emetic give weak alkaline in solution e.g. bi-carbonate of soda, whiting, lime or common soap dissolved in plenty of warm water or hickory tea.

For all plants of which the poisons are chiefly narcotic after emetic give stimulants strong coffee, & wine & keep up circulation & respiration by coed effusions, friction, exercise & artificial respiration - warmth which retards death from narcotic poisoning.

In plants which contain hydrocyanic - (Prussic acid) Rosaceæ if there is time antidotes are Ammonia, Chlorine & water also try coed effusion & artificial respiration

Flower Calendar. 1882

February

14. Primrose in bud
Celandine
Barren Strawberry
Daffodil

March.

6th Bitter-cress
Thail-cress
Rue-leaved Saxifrage
7th Golden Saxifrage
Coll's foot
Primrose out
Anemone
Leopard's bane (garden)
Larch
Palm
Maple
Violet
Liver-wort
Bird-cherry.
Ash
Wych Elm.
Daisy

April.

Ground-ivy
Wild Plum
Wild Raspberry
Stitch-wort
Tooth-wort
Garlic
Bilberry
Bog-violet
Marsh-maregold
Saxifrage
Beech
Moschatae
Herb-Robert
Herb-Paris
Wood-Sanicle
Wood-ruff
Blue-bell or
Wild Hyacinth
White Milk-wort
Blue Milk-wort
Pink Milk-wort
Bitter-Vetch
Orchis
Yellow Loose-strife
Broom
Bugle
Potentilla repens
Cuckoo-flower
Nater Avenus
Sedge-grass
Crab-apple
Globe Flower
Welsh Poppy
Germanander Speed-well.

The signs of Spring in nature as manifested in

Tennison's poem

Crocus

Snowdrop

Bee

Wood. lark

Lark

Tits.

Tops.

Woodpecker

Lined

Woodland - Culver

Halcyon

Violet

Brakes

Apricot

Pine

Beech

Peach

Hawthorne

Lent Lily

Clarendon

Chestnut

Swallow

Cuckoo

Black. cap

Turtle

Starling

Wood. dove

King - cap

Balm

Cocoa - palm

Scarlet. Cane

Mangrove

Canes.